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EFFECTIVE ORIFICE AREA BY CARDIAC MAGNETIC RESONANCE FOR THE FUNCTIONAL ASSESSMENT OF BIOPROSTHETIC AORTIC VALVES

Poster Contributions
Poster Hall B1
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Background: Effective orifice area (EOA) is the current practice for prosthetic valve functional evaluation. We hypothesized that phase contrast (PC) methods could be employed to describe the dynamic EOA, and compared to Doppler-derived EOA in patients with bioprosthetic aortic valves.

Methods: We retrospectively studied 33 patients with aortic bioprostheses that had 42 paired CMR -echo studies within 30 days. Twenty three eligible patients (17 males) were studied. We calculated the PC time velocity integral (TVI) using the instantaneous peak velocities at the level of the prosthetic valve tips provided by PC-CMR, using a MATLAB based application. PC-EOA was calculated by dividing the left ventricle stroke volume calculated during CMR Ejection Fraction (EF) assessment with the calculated PC-TVI.

Results: Bioprosthetic aortic valve peak velocity and TVI by PC-CMR yielded a strong correlation with Doppler peak velocity and TVI ($r=0.918$, $p<0.001$ and $r=0.934$, $p<0.001$ respectively). PC-EOA correlated strongly with the Doppler derived EOA ($r=0.86$, $p<0.001$). A good agreement was shown using Bland-Altman analysis between PC-EOA and Doppler EOA, (bias= 0.21±0.27cm2).

Conclusion: In this study we reported a novel method to determine aortic prosthetic valve EOA using PC-CMR values. We demonstrated a strong correlation and agreement with current Doppler standards for calculating EOA.